

Phospholipid bound choline is better absorbed than choline salt: a randomized trial in adults

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Background

Choline, a vitamin-like essential nutrient, is important throughout life and especially for infant development (brain & organ development and growth) (Fig 1). Low levels are related to diseases. Inadequate choline intake is observed across infants, children, adults, and pregnant women¹. Choline-salts (e.g. choline bitartrate) are therefore added to infant formula, supplements and functional foods. However, natural choline (e.g. phospholipid bound choline (choline-PL)) may result in more efficient absorption².

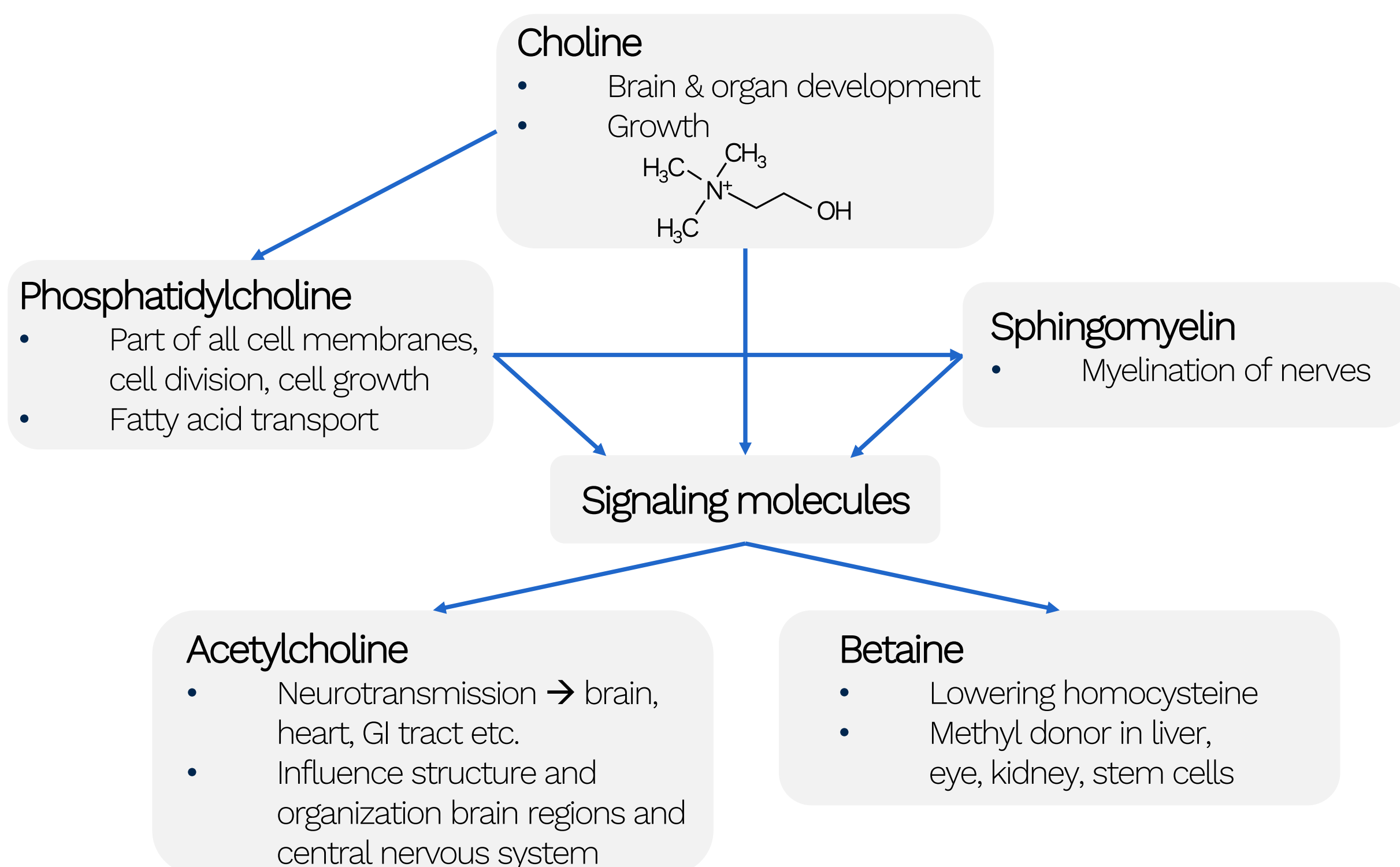


Figure 1: Functions of choline in the human body

Aim

To evaluate whether orally administrated choline-PL from egg yolk phospholipids results in an improved choline absorption compared to choline bitartrate.

Methods

In a randomized, cross-over, double blind, controlled trial, 18 healthy adults (age: 30-70 years, BMI 18.5-24.9 kg/m²) consumed a drink containing 3g choline-PL (ELIP, AAK) and a drink containing 3g choline bitartrate (Table 1). Plasma choline and betaine (choline's main metabolite) were determined at baseline and after ingestion for 6h.

Table 1: Choline containing compounds in test drinks

	Choline-PL drink	Choline bitartrate drink
ELIP (g)	37	-
of which phosphatidylcholine (g)	21.8	-
of which choline (g)	3	-
Choline bitartrate (g)	-	9.3
of which choline (g)	-	3

Conclusion

The current study indicates that choline-PL is 4x times better absorbed than choline bitartrate (after 6 hours). Thus, the choline matrix is important for the choline uptake. Exchanging choline-salts for choline-PL in infant formula, supplements and functional foods, may improve choline's uptake and thereby has a positive health impact.

Results & discussion

Choline absorption was 4 times higher comparing choline-PL with choline bitartrate intake (P<0.001, Fig 2). The effect is consistent in all participants (Fig 3). Choline's metabolite betaine showed similar outcomes; betaine significantly increased comparing choline-PL with choline bitartrate intake (P<0.001, Fig 4).

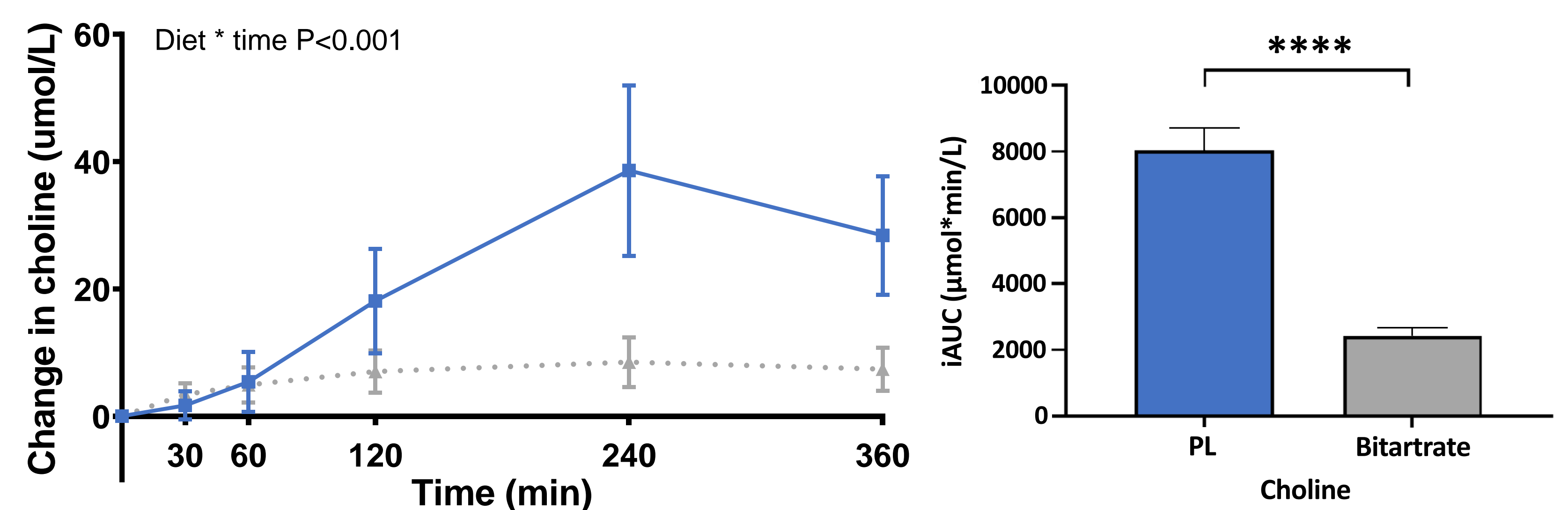


Figure 2: Choline response after intake of choline-PL drink compared to choline bitartrate drink; mean values (A) and iAUC (incremental area under the curve) (B). Graphs indicate means \pm SEM, p****<0.001

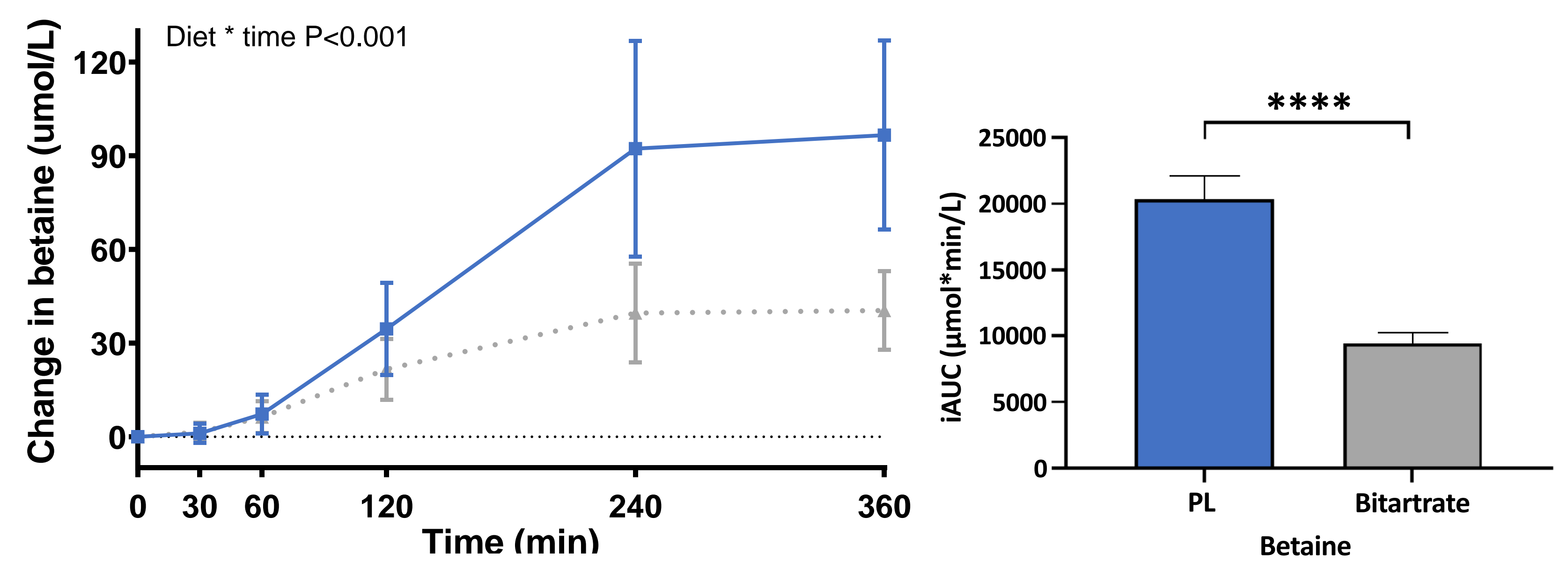


Figure 4: Betaine response after intake of choline-PL drink compared to choline bitartrate drink; mean values (A) and iAUC (incremental area under the curve) (B). Graphs indicate means \pm SEM, p****<0.001

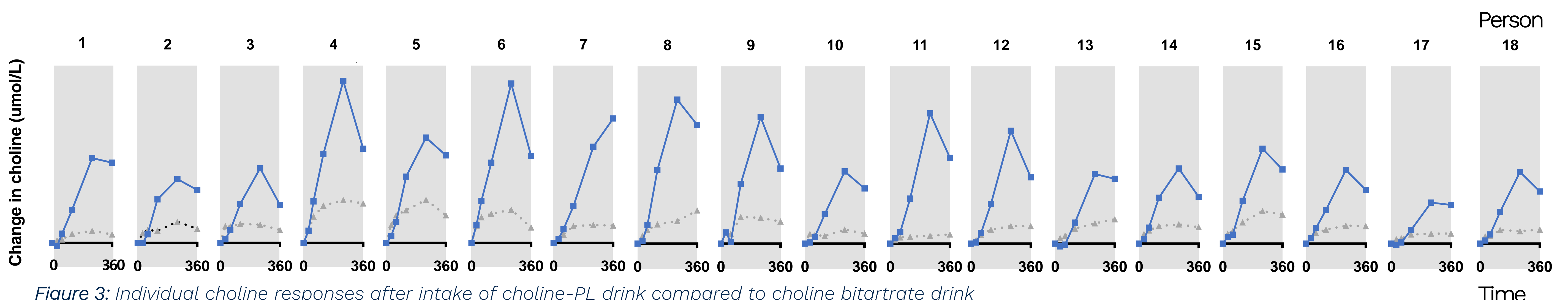


Figure 3: Individual choline responses after intake of choline-PL drink compared to choline bitartrate drink

Legend all figures: ■ Choline-PL drink ▲ Choline bitartrate drink